MIL-W-22759
Extruded ETFE

Applications

For use in aerospace, electronic and electrical installations with ambient or conductor temperatures up to 150º C. ETFE insulation is abrasion resistant, potable and offers excellent chemical resistance.

Identification

Surface printed in accordance with MIL-W-22759
Similar mil-spec constructions available (call factory for details) - MIL-W-81822/13

	M22759/16	M22759/17	M22759/18	M22759/19
Voltage Rating	600	600	600	600
Temperature (° C.)	150	150	150	150
Conductor Type	TPC	SPTF	TPC	SPTF
AWG size & stranding	**Insulation thickness (mils) / Overall diameter (inches)**			
26 19/38	-	11/.040	7/.032	6/.032
24 19/36	11/.045	11/.045	7/.036	6/.036
22 19/34	11/.052	11/.052	7/.043	6/.043
20 19/32	11/.060	11/.060	7/.051	6/.051
18 19/30	12/.071	-	7/.061	-
16 19/29	13/.079	-	9/.070	-
14 19/27	13/.093	-	9/.085	-
12 37/28	14/.114	-	11/.107	-
10 37/26	15/.139	-	13/.134	-
8 133/29	18/.199	-	-	-
6 133/27	23/.250	-	-	-
4 133/25	27/.312	-	-	-
2 665/30	29/.388	-	-	-
1 817/30	31/.431	-	-	-
0 1045/30	32/.479	-	-	-
00 1330/30	44/.546	-	-	-

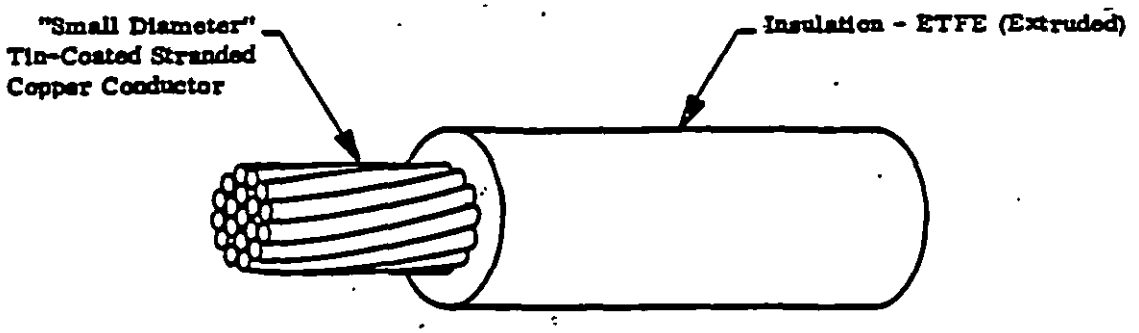
All figures referenced are nominal.

MILITARY SPECIFICATION SHEET

WIRE, ELECTRIC, FLUOROPOLYMER-INSULATED, EXTRUDED ETFE, MEDIUM WEIGHT, TIN-COATED COPPER CONDUCTOR, 600-VOLT, 150°C

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The complete requirements for procuring the wire described herein shall consist of this document and the issue in effect of Specification MIL-W-22759.



ETFE - Ethylene-Tetrafluoroethylene Copolymer

TABLE I. Construction details.

Part No. 1/	Wire size	Stranding (Number of strands X AWG gage of strands)	Diameter of stranded conductor (inches)		Finished wire		
			(min)	(max)	Resistance at 20°C (68°F) (ohms/1000 ft) (max)	Diameter (inches)	Weight (lbs/1000 ft) (max)
M22759/16-24-*	24	19 X 36	.023	.024	26.2	.045 ±.002	2.57
M22759/16-22-*	22	19 X 34	.029	.031	16.2	.052 ±.002	3.68
M22759/16-20-*	20	19 X 32	.037	.039	9.88	.060 ±.002	5.36
M22759/16-18-*	18	19 X 30	.046	.049	6.23	.071 ±.002	7.89
M22759/16-16-*	16	19 X 29	.052	.055	4.81	.079 ±.002	9.95
M22759/16-14-*	14	19 X 27	.065	.069	3.06	.093 ±.002	14.9
M22759/16-12-*	12	37 X 28	.084	.089	2.02	.114 ±.003	22.6
M22759/16-10-*	10	37 X 26	.106	.112	1.26	.139 ±.003	35.1
M22759/16-8-*	8	133 X 29	.158	.169	.701	.199 ±.003	63.5
M22759/16-6-*	6	133 X 27	.198	.212	.445	.250 ±.003	99.9
M22759/16-4-*	4	133 X 25	.250	.268	.280	.312 ±.004	157.
M22759/16-2-*	2	665 X 30	.320	.340	.183	.388 ±.004	Ⓐ 245.
M22759/16-1-*	1	817 X 30	.360	.380	.149	.431 ±.005	314.
M22759/16-01-*	0	1045 X 30	Ⓐ .395	.425	.116	.479 ±.006	391.
M22759/16-02-*	00	1330 X 30	Ⓐ .440	.475	.091	.546 ±.007	504.

1/ PART NO.: The asterisks in the part number column, Tables I and II, shall be replaced by color code designators in accordance with MIL-STD-681. Examples: Size 20, white - M22759/16-20-9; white with orange stripe - M22759/16-20-93.

Ⓐ denotes changes

Ⓐ TABLE II. Bend test mandrels and test loads.

Part No.	Mandrel diameter (inches) (±3%)			Test load (lbs) (±3%)	
	Life cycle test and short-term thermal stability test 1/	Cold bend test	Wrap test 2/	Life cycle test and short-term thermal stability test 1/	Cold bend test
M22759/16-24-*	.50	1.00	-	0.5	3.0
M22759/16-22-*	.75	1.00	-	1.5	3.0
M22759/16-20-*	.75	1.00	-	2.0	4.0
M22759/16-18-*	1.00	1.25	-	2.0	4.0
M22759/16-16-*	1.00	1.25	-	2.0	5.0
M22759/16-14-*	1.25	2.00	-	2.0	5.0
M22759/16-12-*	2.00	2.00	-	2.0	5.0
M22759/16-10-*	3.00	3.00	-	2.0	5.0
M22759/16-8-*	3.00	4.00	-	3.0	6.0
M22759/16-6-*	4.00	5.00	-	3.0	10.0
M22759/16-4-*	5.00	6.00	-	3.0	10.0
M22759/16-2-*	6.00	8.00	1.25	4.0	15.0
M22759/16-1-*	8.00	10.0	1.25	4.0	15.0
M22759/16-01-*	8.00	10.0	1.75	4.0	15.0
M22759/16-02-*	10.0	14.0	1.75	6.0	20.0

1/ Also for bend tests after immersion.
2/ Use mandrel for wire sizes 2 and larger in "wrap back" test.

WIRE RATINGS AND ADDITIONAL REQUIREMENTS

TEMPERATURE RATING: 150°C (302°F) max conductor temperature
VOLTAGE RATING: 600 volts (rms) at sea level
SHORT-TERM THERMAL STABILITY: 7 hours at 230 ±2°C (446 ±3.6°F). Quality conformance test, Group II; test procedures and requirements as in life cycle test except for time and temperature of oven exposure
ACID RESISTANCE: No requirement
BLOCKING: 200 ±2°C (392 ±3.6°F)
COLOR: In accordance with MIL-STD-104, Class 1; white preferred
COLOR STRIPING OR BANDING DURABILITY: 125 cycles (250 strokes) (min), 500 grams weight
DIELECTRIC TEST AFTER IMMERSION: 2200 volts (rms), 60Hz
FLAMMABILITY: Vertical flame test (see page 3); 2 sec (max) after-flame, 5.50 in (max) burn length
Post-flame dielectric test not required
HUMIDITY RESISTANCE: After humidity exposure, wire shall meet the requirements for initial insulation resistance.
IDENTIFICATION OF PRODUCT: Required
IDENTIFICATION DURABILITY: 125 cycles (250 strokes) (min), 500 grams weight
IMPULSE DIELECTRIC TEST: 8.0 kilovolts (peak), 100% test
INSULATION RESISTANCE, INITIAL: Sizes 24 through 14: 5000 megohms for 1000 ft (min)
Sizes 12 through 6: 3000 megohms for 1000 ft (min)
Sizes 4 through 00: 2000 megohms for 1000 ft (min)
LIFE CYCLE: Oven temperature, 200 ±2°C (392 ±3.6°F)
Dielectric test, 2200 volts (rms), 60Hz
LOW TEMPERATURE (COLD BEND):
Bend temperature: -65 ±2°C (-85 ±3.6°F)
Dielectric test, 2200 volts (rms), 60Hz
SHRINKAGE: 0.125 inch max at 200 ±2°C (392 ±3.6°F)
SMOKE: 200°C (392°F)
SPARK TEST OF PRIMARY INSULATION: Not required
SURFACE RESISTANCE:
Sizes 24 through 12: 500 megohm-inches (min), initial and final readings
Sizes 10 through 00: No requirement

THERMAL SHOCK: Oven temperature, 150 ±2°C (302 ±3.6°F)
Max change in measurement
Sizes 24 through 12: 0.060 inch
Sizes 10 through 8: 0.100 inch
Sizes 6 through 00: 0.125 inch

WICKING: No requirement

Ⓐ WIRE LENGTH REQUIREMENTS: Schedule A (See wire length schedules in MIL-W-22759)

WRAP TEST: "Wrap back" test required; no cracking (See Table II, Note 2)
Oven temperature, 200 ±2°C (392 ±3.6°F)

INTENDED USE NOTE: The wire of this specification sheet is intended for interconnecting and hookup applications.

Ⓐ VERTICAL FLAME TEST

Apparatus - The flammability test chamber shall be approximately one foot square by two feet in height and shall be open at the top and front to provide adequate ventilation for combustion but prevent drafts. Inside the chamber, near the open top, a clamp shall be provided from which the wire specimen may be suspended vertically about six inches in front of the rear wall of the chamber and equidistant from the two sides. The test burner shall be a Bunsen type gas burner having a 1/4 inch inlet, a bore of 3/8 inch nominal, and a length of approximately 4 inches above the primary air inlets. The burner shall be capable of providing the specified test flame, which shall be a 3-inch flame with an inner cone approximately one third of the total flame height and a temperature, at its hottest portion, of 1010 ±56°C (1850 ±100°F) as measured by a thermocouple pyrometer.

Procedure - An 18 ±1/2 inch wire specimen marked 14 ±1/2 inches from its upper end to indicate where the test flame is to be applied, shall be suspended in the vertical position in the chamber and a weight equal to that specified for life cycle test of the same wire shall be attached to the lower end of the specimen to keep it taut during the flame exposure. With the test flame adjusted as specified in the preceding paragraph and with the burner held upright but inclined 20 degrees from vertical toward the specimen, the hottest portion of the flame shall be applied for 15 seconds to the approximate position of the test mark on the wire and shall then be withdrawn. The duration of flaming in the specimen after withdrawal of the gas test flame shall be timed and recorded in seconds. The burn length on the specimen as indicated by burned, charred, or melted insulation shall be measured and recorded to the nearest 1/8 inch. Areas of the specimen having the original insulation undamaged but covered with soot deposit removable by wiping or covered with material which has melted and flowed down the wire shall not be considered as part of the burn length. Breaking of the wire specimen in size 24 or smaller shall not be considered as failure. If breaking occurs in 3 or more specimens, a 22-gage specimen may be substituted for purposes of this test.

Ⓐ Metric Conversion Note: Data in this specification sheet may be converted to metric as follows:

Linear dimensions	25.40 x inches = millimeters (mm)
Weight (general)	.4536 x lbs = kilograms (kg)
Wire weight	1.488 x (lbs/1000 ft) = kg/km
Conductor resistance	3.281 x (ohms/1000 ft) = ohms/km
Insulation resistance	.3048 x (megohms for 1000 ft) = megohms for 1 km
Surface resistance	25.00 x (megohm-inches) = megohm-millimeters

Custodians:
Navy - AS
Army - CR
Air Force - 85

Review activities:
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Army - AR, AV, ME
Air Force - 99
DLA - IS
NSA

Preparing activity:
Navy - AS
(Project No. 6145-0767)

User activities:
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Army - AT
Air Force - 11

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CUMENT IDENTIFIER *(Number)* AND TITLE

MIL-W-22759/16A, Wire, Electric, Fluoropolymer-Insulated, Extruded ETFE --

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E? ☐ IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

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